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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/594,393	09/27/2006	Janet E. Hails	124-1174	9262

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EXAMINER	
ENAD, CHRISTINE A	
ART UNIT	PAPER NUMBER
2823	
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09/02/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/594,393	HAILS ET AL.	
	Examiner	Art Unit	
	CHRISTINE ENAD	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 July 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,6 and 8-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,6,8-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *7/13/2010*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This office action is in response to applicant's amendments and remarks filed July 13, 2010.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 6, 8, 10, 11 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over de Lyon et al (US Patent No. 6,045,614).

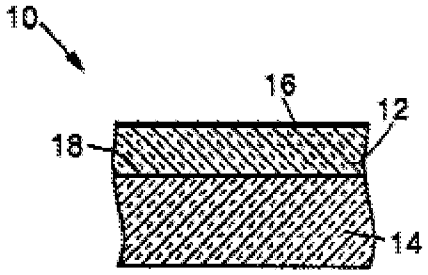

FIG. 1a.

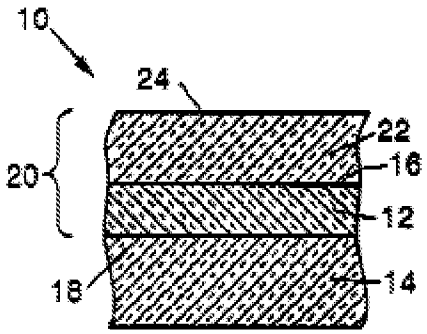

FIG. 1b.

In re claim 1, de Lyon discloses a method of fabricating a infrared device comprising a cadmium mercury telluride, Hg1-x Cdx Te where x is 0<=x<=1, and a device layer **Fig 1A-1B** (Column 1, 5-15), the method comprising the steps of a) taking a crystalline silicon substrate **14**, b) growing one or more buffer layers **12/22** selected

from zinc telluride, cadmium telluride and cadmium zinc telluride on said substrate **14** by molecular beam epitaxy to form a buffered silicon substrate (Column 5, lines 47-67), and c) growing at least one device layer of cadmium mercury telluride on the buffered silicon substrate by metal-organic vapour phase epitaxy (Column 1, lines 15-30; Column 5, lines 33-67; Column 7, lines 24-37; Claim 19). Alternatively, it would have been obvious to one having ordinary skill in the art to use the HgCdTe layer formed by de Lyon as the device layer and further processing is intended for the formation of infrared detectors (Column 1, lines 5-12).

In re claim 6, de Lyon discloses a wherein the silicon substrate orientation is (001) mis-aligned between 1° and 10° towards the [111] direction (Column 6, lines 1-10).

In re claim 8, de Lyon discloses wherein the step of growing at least one buffer layer by molecular beam epitaxy comprises the step of growing a layer of zinc telluride on the substrate and growing a layer of cadmium telluride on said zinc telluride layer (Column 6, lines 25-38; Column 7, lines 23-37).

In re claim 10, de Lyon discloses wherein the method further comprises the step, after growing at least one buffer layer by molecular beam epitaxy, of growing at least one buffer layer by metal organic vapour phase epitaxy (Column 6, lines 40-54).

In re claim 11, de Lyon discloses wherein at least one buffer layer grown by metal organic vapour phase epitaxy step is the same as a buffer layer grown by molecular beam epitaxy (Column 5, lines 48-67; Column 6, lines 40-67; Column 7, lines 24-37).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over de Lyon et al (US Patent No. 6,045,614) in further view of Nouhi A. et al. (Applied Physics Letters, American Institute of Physics, NY, US vol 52, no.24 (1988-06-13; pages 2028-2030)).

In re claim 9, de Lyon discloses all the limitations except for the cleaning of the layer. Whereas Nouhi discloses prior to the step of growing the at least one layer of cadmium mercury telluride, of cleaning the surface of the uppermost buffer layer grown by molecular beam epitaxy (Column 2, line 36-Column 3, line 3). Therefore it would have been obvious to one having ordinary skill of the art at the time the invention was made to incorporate a cleaning step to degrease and remove oxide and contaminants in the layer.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over de Lyon et al (US Patent No. 6,045,614) in further view of Johnson S et al (Journal of Electronic Materials, Warrendale, PA, US vol.24, no. 5, 1 May 1995, pages 467-473).

In re claim 12, de Lyon discloses all the limitations except for the growing a further another layer. Whereas Johnson discloses the step of growing at least one buffer layer by molecular beam epitaxy comprises growing a top layer of cadmium telluride on a base layer zinc telluride on the substrate the step of growing at least one further buffer layer comprises growing a further cadmium telluride layer by metal organic vapour phase epitaxy (Column 4, lines 21-40 and Column 5, lines 33-41). Therefore it would have been obvious to one having ordinary skill of the art at the time the invention was made to modify and incorporate additional buffer layer to maintain the Si substrate orientation and attain thickness uniformity (Column 12, lines 15-26).

Claim 13-22 is rejected under 35 U.S.C. 103(a) as being unpatentable over de Lyon et al (US Patent No. 6,045,614) in further view of Hails et al. (US Patent No. 7,026,228).

In re claim 13, de Lyon discloses all the limitations except for sequentially growing thin layers of CdTe and HgTe. Whereas Hails discloses the step of growing the at least one cadmium mercury telluride layer comprises sequentially growing thin layers of CdTe and HgTe which interdiffuse during growth to give a single layer of CMT, the relative thicknesses of the CdTe and HgTe layers determining the cadmium content x. (Claim 1 and Column 4, line 64-Column 5, line 8). Therefore it would have been obvious to one having ordinary skill of the art at the time the invention was made to modify the method of growing cadmium mercury telluride layer to avoid undesirable by products from the precursor (Column 2, lines 37-54).

In re claim 14, Hails discloses di- iso-propyltelluride is the tellurium precursor and dimethylcadmium is the cadmium precursor in the step of growing the at least one cadmium mercury telluride layer by MOVPE (Column 4, lines 1-2).

In re claim 15, Hails discloses the step of growing the at least one cadmium mercury telluride layer involves doping at least one of the cadmium mercury telluride layers with a dopant (Column 6, lines 32-52).

In re claim 16, Hails discloses the dopant is chosen from iodine, arsenic, indium, phosphorous and antimony (Column 6, lines 32-52).

In re claim 17, Hails discloses the step of growing at least one cadmium mercury telluride layer comprises the step of growing a plurality of layers of cadmium mercury telluride, at least some of the layers having a different thickness, composition, dopant and/or dopant concentration (Column 6, lines 34-60).

In re claim 18, Hails discloses the step of device processing (Column 6, lines 34-67).

In re claim 19, Hails discloses the method comprises the step, after the device processing step, of coating the devices with at least one passivating layer (Claim 10).

In re claim 20, Hails discloses the at least one passivating layer comprises cadmium telluride (Claim 10).

In re claim 21, Hails discloses the step of coating the device with a passivating layer comprises growing at least one epitaxial layer grown by metal organic vapour phase epitaxy (Column 3, lines 15-25 and lines 55-61).

In re claim 22, Hails discloses the method involves the step, after the device processing step, of growing further epitaxial layers of cadmium mercury telluride by metal organic vapour phase epitaxy (Column 3, lines 45-67).

Claims 18 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over de Lyon et al (US Patent No. 6,045,614) in further view of Wang et al. (US Patent No. 5,192,695).

In re claim 18, de Lyon discloses all the limitations except for the device processing. Whereas Wang discloses the step of device processing **Fig 4A.** Therefore it would have been obvious to one having ordinary skill of the art at the time the invention was made to modify the method of de Lyon and incorporate device processing as taught by Wang to manufacture an infrared detector.

In re claim 22, Wang discloses the method involves the step, after the device processing step, of growing further epitaxial layers of cadmium mercury telluride by metal organic vapour phase epitaxy **Fig 4A, 18 and 20.**

Response to Arguments

Applicant's arguments with respect to claims 1, 6, 8-22 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's submission of an information disclosure statement under 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p) on July 13, 2010 prompted the new

ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 609.04(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTINE ENAD whose telephone number is (571)270-7891. The examiner can normally be reached on Monday - Thursday, 7:30 am - 6:00 pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on (571) 272 1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Examiner
Art Unit 2823

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Examiner, Art Unit 2823

/W. David Coleman/
Primary Examiner, Art Unit 2823